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A REVIEW OF THE USE
OF 2,4-D, OTHER
PHENOXY HERBICIDES
AND PICLORAM BY ONTARIO
GOVERNMENT AGENCIES

FEBRUARY, 1979



Ontario

The Ontario Pesticides
Advisory Committee

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A REVIEW
OF THE USE OF 2,4-D
OTHER PHENOXY HERBICIDES, AND PICLORAM
BY ONTARIO GOVERNMENT AGENCIES

FEBRUARY, 1979

THE ONTARIO PESTICIDES ADVISORY COMMITTEE



D.N. Huntley, Ph.D.
Chairman

A.R. Chisholm
Executive
Secretary

**Ministry of the
Environment**

**Pesticides
Advisory
Committee**

416/965-7048

**Mowat Block
5th Floor
Queen's Park
Toronto Ontario
M7A 1A2**

Honourable Harry C. Parrott
Minister
Ministry of the Environment
135 St. Clair Avenue West
14th floor
TORONTO, Ontario

Dear Dr. Parrott:

I submit herewith a review by the Pesticides Advisory
Committee of the use of 2,4-D, other phenoxy herbicides,
and picloram by Ontario Government agencies.

Respectfully submitted,

A handwritten signature in cursive script that reads "D. N. Huntley".

D. N. HUNTLEY
CHAIRMAN

DNH/gm

encl.

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INTRODUCTION

Following a review of the National Research Council report on phenoxy herbicides, the Pesticides Advisory Committee, under the authority of S.9(3) of The Pesticides Act, 1973, examined the herbicide programs of three Ontario Government agencies, namely, the Ministry of Transportation and Communications, Ministry of Natural Resources, and Ontario Hydro. This report outlines the Committee's findings.

REVIEW OF THE USE OF 2, 4-D,
OTHER PHENOXY HERBICIDES, AND PICLORAM
BY ONTARIO GOVERNMENT AGENCIES

Phenoxy herbicides such as 2, 4-D have been widely used in Ontario since 1947, and, with the exception of some mortality to bees, no adverse effects to man or animal have been reported. However, there may be certain individuals, representing an extremely low percentage of the population, who are allergic to the phenoxy herbicides or the solvents used in the formulations.

GOVERNMENT CONTROL

Legislatively, all pesticides, including phenoxy and other herbicides, must be federally registered under The Pest Control Products Act administered by Agriculture Canada, with input by various Ministries, including National Health and Welfare, and Environment Canada. At the provincial level in Ontario, the transportation, distribution, storage, sale and use of all pesticides are controlled by The Pesticides Act, 1973.

Since the introduction in Ontario of pesticide classification in 1972, highly volatile formulations of phenoxy herbicides have been restricted to permit-use, and no permits have been issued. Access to low volatile formulations is limited to agriculturists and qualified licenced applicators. Permits are required for aerial applications. Amines, being relatively non-volatile, are available to the general public in accordance with registered uses, but their commercial use is governed by the Act and Regulations.

Picloram is a highly active and persistent non-phenoxy herbicide for the control of certain species of woody plants and broadleaf weeds. Because of this activity, the use of herbicides containing picloram is restricted under the authority of The Pesticides Act, 1973, and can only be used on a permit basis. It is, however, generally concluded from the available toxicological data that the use of picloram presents no known hazard to humans, livestock or wildlife (Picloram: NRC report No. 13684 (1974)).

The Ontario Weed Committee, responsible to the Ontario Ministry of Agriculture and Food for herbicide recommendations contained in Agriculture and Food publication 75 - Guide To Chemical Weed Control - does not recommend the use of picloram in Ontario by the general public. It does, however, endorse the use of picloram by the Ministry of Transportation and Communications, and Ontario Hydro under the present regulatory requirements. That committee is satisfied that picloram products are being used in a safe and responsible manner by these two groups, primarily because they use properly trained people and specially designed equipment.

Based on this information and on a review of the present permit system, the Pesticides Advisory Committee is of the opinion that the controls surrounding the use of picloram products meet the intent of The Pesticides Act, 1973.

OVERALL USE IN ONTARIO *

1. Agriculture

According to the Ontario Ministry of Agriculture and Food the estimated use of phenoxy herbicides in agriculture is 1.25 million kg, about 1 million kg of which is composed, in the main, of 2,4-D amine. Other phenoxy herbicides in agriculture are M.C.P.A., 2,4-DB, M.C.P.B., 2,4-DP, and mecoprop. 2,4,5-T is not used in crop land but is used, to a minor degree, in non-crop land such as fence rows.

2. Provincial Government Agencies

a) Ministry of Transportation and Communications

In 1978 the Ontario Ministry of Transportation and Communications used approximately: -

| | | |
|--------------------------|-----------|----------------------|
| 2,4-D amine | 12,125 kg | |
| 2,4-D L.V. ester | 16,200 kg |) 1:1 mixture |
| 2,4,5-T L.V. ester | 16,200 kg | |
| 2,4-D amine | 16,875 kg |) Tordon 101 mixture |
| picloram | 4,230 kg | |

b) Ministry of Natural Resources

In 1977 the Ministry of Natural Resources used approximately: -

| | |
|--------------------------|---------------------|
| 2,4-D L.V. ester | 40,000 kg per annum |
| 2,4,5-T L.V. ester | 3,300 kg per annum |

c) Ontario Hydro

In 1978 Ontario Hydro used approximately: -

| | | |
|-----------------------------|-----------|----------------------|
| 2,4-D L.V. ester | 5,720 kg |) 1:1 mixture |
| 2,4,5-T L.V. ester | 5,720 kg | |
| 2,4,5-T L.V. ester | 24,960 kg | |
| fenoprop | 1,045 kg | |
| 2,4-D amine | 12,830 kg |) Tordon 101 mixture |
| picloram | 3,210 kg | |
| picloram (Tordon 10K) | 3,960 kg | |
| 2,4-D amine | 1,670 kg | |

* Figures quoted represent active ingredient.

3. Municipalities

According to information provided by the Ontario Ministry of Agriculture and Food, municipalities across Ontario apply approximately 87 thousand kg of 2,4-D and 2,4,5-T mixtures to control noxious weeds and unwanted brush.

4. Other Uses

Additional uses of phenoxy herbicides include rail-lines, telephone lines, oil and gas pipe lines, private use by companies and homeowners. The amount cannot be estimated at this time, but is small, relative to the above listed uses.

USE BY THE MINISTRY OF TRANSPORTATION AND COMMUNICATIONS

The Ministry conducts a weed control program in Southern Ontario highways to reduce noxious weeds as defined in The Weed Control Act. 2,4-D amine as a water spray or invert spray is used on most rights-of-way and Tordon 101 (picloram +2,4-D amine) on selected highways (e.g. 401) applied as a thickened spray. Specially designed equipment is used for the inverted and thickened sprays.

In Northern Ontario a brush control program is carried out to improve road visibility and to facilitate snow removal operations. The area is fairly extensive, and spraying programs are carried out at the most opportune times relative to efficient control.

The herbicide used is a mixture of low volatile esters of 2,4-D and 2,4,5-T or a mixture of 2,4-D and picloram. The latter mixture has the trade name Tordon 101. Picloram, a non phenoxy herbicide,

is highly active for the control of many woody plants and broadleaf weeds. It is very persistent in the soil, and its use by the Ministry is limited to once every five to seven years. Although very toxic to most plants except grasses, it has a low toxicity to animal life. Its use in Ontario requires a permit from the Ministry of the Environment.

The overall program consists of treating 20 - 30 thousand of an estimated 101 thousand hectares per annum. The Ministry considers roadside spraying to be a skilled operation, and each applicator is well trained and licenced under The Pesticides Act. The Ministry provides an excellent roadside vegetation management manual, adequate training and supervision. Also provided are protective clothing and equipment for the operators.

USE BY THE MINISTRY OF NATURAL RESOURCES

The Ministry is responsible for regenerating Ontario's public forests to tree species with commercial value, for example, spruce, fir and jack pine. Logging operations in northern Ontario are often followed by a rapid growth of poplar and other fast growing deciduous trees of low value which delay the return of the conifer forest.

To assist in the re-establishment of growth of the conifer forest a "conifer release" program has been in operation since 1955 using 2,4-D as the control agent to keep down competition from poplar and other deciduous trees. The Ministry is responsible for management of 38 million hectares of forest; of this, 16 to 20 thousand hectares are treated each year for conifer release. Generally no more than two treatments are required during the 50 year life of a particular forest. No off-target adverse effects have been recorded.

Applicators are licenced by the Ministry of the Environment under The Pesticides Act.

USE BY ONTARIO HYDRO

The Forestry Department of Ontario Hydro manages vegetation on over 40 thousand km of main transmission lines, plus 90 thousand km of rural distribution lines to include an area covering upward of 300 thousand hectares. Brush control is necessary on approximately 121 thousand hectares to control fast growing suckering species such as maple, ash, birch and poplar, which in some cases may attain heights of 1.8 to 2.5 meters per year.

Vegetation control programs include selective cutting and spraying of tall, fast growing species along new hydro lines. The first treatments may extend over three years, followed by intervals of six to seven years. About 17 thousand hectares are treated each year. Weed control is also carried out where necessary in compliance with The Weed Control Act and in areas where this form of maintenance is in keeping with the surroundings.

Products used include 2,4-D amine, 2,4,5-T L.V. ester, mixtures of 2,4-D and 2,4,5-T L.V. esters, Tordon 101 and a limited quantity of fenoprop. In addition, Tordon 10K (10% picloram) is applied in northern Ontario from aircraft for control of black spruce and other phenoxy resistant species, the applications being confined to the rights-of-way up to six meters from either edge.

Training for pesticide applicators is provided as part of a three-year forestry journeyman course, and one "exterminator" licensed under The Pesticides Act, 1973, is in charge of each spray crew. According to Ontario Hydro, personnel involved in spraying are required to follow all safety rules laid down regarding protective clothing and the handling and use of pesticides. A comprehensive pesticide application manual is provided.

It is Ontario Hydro policy to contact property owners before any job is started. Herbicide usage in specific areas is not carried out if the property owner is opposed to the application.

WILD BERRIES IN SPRAYED AREAS

Wild berries, such as raspberry, strawberry and blueberry, thrive on many rights-of-way, particularly in northern Ontario. Concern has been expressed over the human hazard attending the ingestion of freshly picked berries harvested within several days following 2,4-D, 2,4,5-T or picloram treatments.

The acute oral LD₅₀ values for the three herbicides in the diluted and applied forms indicate little likelihood of human poisoning. Treated areas are not required to be "posted".

A 1978 report, issued by the Ministry of Health, Melbourne, Australia, on congenital abnormalities discusses the "no effect" levels for teratogenic effects resulting from phenoxy herbicide treated wild blackberries.

Taking the most conservative view, "no effect" levels for teratogenic effects in the most sensitive laboratory species would be 25 mg/kg/day, 20 mg/kg/day and 0.03 µg/kg/day for 2,4-D, 2,4,5-T and TCDD (Dioxin) respectively. This was compared with likely exposure levels within the human population. An example cited was blackberries collected immediately after the bushes had been sprayed at the rate of approximately 2.25 kg/ha. To reach the "no effect" level for 2,4,5-T a 60 kg pregnant woman, as determined from laboratory animals, would have to ingest 24 kg sprayed blackberries. To reach the "no effect" level for the contaminant TCDD, 360 kg blackberries would have to be ingested. This indicates a very large safety factor in regard to teratogenic hazard from 2,4-D and 2,4,5-T sprayed at normal rates.

The relative data presented in regard to 2,4-D indicated that a 300 kg quantity of fruit (citrus) would have to be ingested to reach the "no effect" level. This assumes a 2,4-D residue of 5 ppm on the fruit which is the

maximum set by the National Health and Medical Research Council of Australia. This level is rarely, if ever, reached with food crops in Australia.

This indicates that the acute toxic effects of the chemicals 2,4-D and 2,4,5-T, and TCDD (at max. levels in 2,4,5-T) would cause death prior to reaching teratogenic causing levels.

Picloram is much lower in toxicity levels to mammals than 2,4-D and 2,4,5-T. There are no known cases of carcinogenic or teratogenic effects from picloram in laboratory animal tests.

To obtain Canadian data on herbicide residues in treated wild berries, it is recommended that residue analyses be obtained in 1979.

CONCLUSION

It is the opinion of the Pesticides Advisory Committee that the use of 2,4-D, other phenoxy herbicides, and picloram by the Ministry of Transportation and Communications, Ministry of Natural Resources, and Ontario Hydro in vegetative management, as described, is justified and of minimal environmental hazard.

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